Examiner Jones,

I have reviewed each of the applications. I am not surprised that you had so many questions about these cases. They are so closely related and I believe they have been incorrectly titled since the time they were filed. They all have the same specification and are different only in the claims that each is directed to. They are related as follows:

10/707,365 claims are directed to operating the vehicle model with **understeer** and is described with reference to **Figure 4**. Understeer is when the front of the vehicle is plowing and does not respond to a change in steering wheel angle. The claims, as originally filed and amended throughout prosecution correctly reflect this.

10/707,366 claims are directed to operating the vehicle model with **oversteer** and is directed to **Figure 5**. The title was corrected to reflect this on May, 2, 2007. The error in paragraph [0033] relative to Figure 5 was also corrected on January 22, 2008. A terminal disclaimer has been filed and accepted relative to 10/707,368 on November 29, 2006.

10/707,368 (On separate Appeal) claims are directed to operating the vehicle model in an **aggressive limit-seeking manner** and is described with reference to **Figures 6 and 7**.

Terminal disclaimers are on file in each of the applications relative to one another.

Keeping this in mind as I worked through the issues we discussed on 11/5. Here are proposed claim amendments for each of the two cases that are on appeal with you. Keep in mind that "understeer" is when the front of the vehicle is plowing and the vehicle does not response to a change in steering wheel angle and is related to Figure 4 and 10/707,365. "Oversteer" is when the rear of the vehicle fishtails, or slips out laterally relative to the front of the vehicle and is related to Figure 5 and 10/707,366.

I look forward to talking with you about the following suggestions.

10/707,365

A marked up replacement sheet is attached for Figures 5 and 7. Ref. No. 114 of Figure 5 should read "Multiply" instead of "Multiple" and Ref. No. 124 of Figure 7 should read "Use Function in Fig. 6" instead of "Use fcn in Fig. 1".

In9 10/707,365 Claims 1-3, 7-12, and 16-29 are pending. The claims have all been rejected under 35 U.S.C. §103(a) in view of Pallot. Appellants have argued that the Pallot reference does not teach or disclose the following steps of independent claims 1, 12 and 21, with reference to Figure 4:

> determine understeering due to the front of said vehicle computer model plowing **(80)** or slipping substantially forward in response to said new steering wheel angle **(84)**; and
>
> when said vehicle computer model is determined to be understeering, operate said vehicle computer model with said initial steering wheel angle **(88,92)** until a new steering wheel angle is determined such that said plowing or slipping substantially forward is thereby reduced **(90, 86)**

In our phone conversation of 11/4, you suggested that "aggressive driving", be incorporated into the claims and also requested that Figure 5 be integrated into the independent claims in a more obvious manner. In light of the explanation of each application above, for 10/707,365 I have added "understeer" into the preamble and have pointed out where the independent claims reflect Figure 4, support for which may be found at about [0029] of the specification as filed.

Figure 4, paragraph [0032] of the specification as filed reflects the sections of the claims, as cited above, that relate to the determination of understeering. A repeated comparison is made of the existence of understeer (80, 84) and the

determination of a new steering wheel angle (86) is made only in the event the error between the SWA being held and the current SWA is being reduced (90). Therefore, the newly computed steering wheel angle (78) will not be applied until the point in time that understeer has been reduced below the predetermined threshold value, see paragraph [0031].

Further, the present invention determines understeer in a very particular manner in that it is identifying understeer through the detection of plowing or slipping substantially forward in response to a newly determined steering wheel angle. The presence or absence of understeer will affect the application of the newly computed steering wheel angle.

In contrast, the Pallot reference does not teach or disclose the determination of understeering, nor does the reference teach or disclose determining the presence of understeering through plowing or slipping forward as claimed in the present invention. Instead, the Pallot reference discloses detecting tire saturation, and describes events that may or may not occur as a result of tire saturation.

Now for the proposed claim amendments with references to Figure 4 highlighted in bold type:

1. (Proposed) A simulation system for simulating operation of an automotive vehicle, particularly operating in understeer, said simulation system comprising:

(i) an input device for providing vehicle information and path information; and

(ii) a controller coupled to said input device and operable to simulate said automotive vehicle using a vehicle computer model, wherein said controller is programmed to:

(a) determine an initial steering wheel angle that is input to said vehicle computer model **(74)**;

(b) determine a new steering wheel angle, which is input to said vehicle computer model at a time later than said initial steering wheel angle, by comparing an intended vehicle path with a look ahead point on said intended vehicle path **(78)**;

(c) determine whether said vehicle computer model is understeering due to the front of said vehicle computer model plowing **(80)** or slipping substantially forward in response to said new steering wheel angle **(84)**;

(d) when said vehicle computer model is determined to be understeering, operate said vehicle computer model with said initial steering wheel angle **(92, 88)** until a new steering wheel angle is determined such that said plowing or slipping substantially forward is thereby reduced **(84, 90)**;

(e) when said plowing or slipping substantially forward is reduced by a new steering wheel angle **(90)**, operate said vehicle computer model with said new steering wheel angle **(86)**; and

(f) generate an output in response to said vehicle computer model and said initial steering wheel angle or said new steering wheel angle.

12. (Proposed) A method of operating a vehicle computer model having vehicle information and path information therein, the vehicle computer model operating with oversteer, said method being operable on a digital computer system and comprising the steps of:

(a) determining an initial steering wheel angle that is input to said vehicle computer model;

(b) determining a new steering wheel angle, which is input to said vehicle computer model at a time later than said initial steering wheel angle, by comparing an intended vehicle path with a look ahead point on said intended vehicle path **(78)**;

(c) determining whether said vehicle computer model is understeering due to the front of said vehicle computer model plowing **(80)** or slipping substantially forward in response to said new steering wheel angle **(82)**;

(d) determining whether said vehicle computer model is plowing or slipping substantially forward based on whether a yaw acceleration is greater than a predetermined threshold **(84, 90)** and also whether said new steering wheel angle is greater than said initial steering wheel angle or a previously determined new steering wheel angle **(90)**;

(e) when said vehicle computer model is determined to be understeering, operating said vehicle computer model with said initial steering wheel angle **(92, 88)** until a new steering wheel angle is determined such that said plowing or slipping substantially forward is thereby reduced **(90, 84)**;

(f) when said plowing or slipping substantially forward is reduced by a new steering wheel angle, operating said vehicle computer model with said new steering wheel angle **(86)**; and

(g) generating an output in response to said vehicle computer model and said initial steering wheel angle or said new steering wheel angle.

21. (Previously Presented) A method of operating a vehicle computer model having vehicle information and path information therein, the

vehicle computer model operating with oversteer, said method being operable on a digital computer system and comprising the steps of:

(a) determining a plurality of steering wheel angles **(78)**, each associated with a different time stamp and input to said vehicle computer model, by comparing an intended vehicle path with a look ahead point on said intended vehicle path at various times **(76)**;

(b) determining whether said vehicle computer model is understeering due to the front of said vehicle computer model plowing **(80)** or slipping substantially forward in response to said plurality of steering wheel angles;

(c) determining whether said vehicle computer model is plowing or slipping substantially forward based on whether a yaw acceleration is greater than a predetermined threshold **(84)**;

(d) when said vehicle computer model is determined to be understeering, operating said vehicle computer model at one of said plurality of steering wheel angles **(88, 82)** until a later one of said plurality of steering wheel angles is determined such that said plowing or slipping substantially forward is thereby reduced **(84, 90)**;

(e) when said plowing or slipping substantially forward is reduced by a later one of said plurality of steering wheel angles, operating said vehicle computer model with said later one of said plurality of steering wheel angles **(86)**; and

(f) generating an output in response to said vehicle computer model and said later one of said plurality of steering wheel angles.

10/707,366

Replacement sheet will be submitted for Figures 5 and 7. Ref. No. 114 of Figure 5 should read "Multiply" instead of "Multiple" and Ref. No. 124 of Figure 7 should read "Use function in Fig. 6" instead of "Use fcn in Fig. 1".

In 10/707,366 Claims 1-20 are pending. The claims have all been rejected under 35 U.S.C. §103(a) over Sharp in view of Peng. Appellants have argued that the cited references do not teach or disclose the following steps of independent claims 1, 10 and 19, with reference to Figure 5:

> when said rear side slip angle is determined to be greater than a predetermined threshold, determine a look ahead scale factor and increase the distance of a look ahead point substantially on or near [[an]] a driver intended vehicle path as a function of said look ahead scale factor;
>
> determine a new steering wheel angle, which is input to said vehicle computer model at a time later than said initial steering wheel angle, by comparing said driver intended vehicle path with said look ahead point on or near said driver intended vehicle path

Appellants assert that the driver intended path will allow for the application to collect meaningful simulation data during aggressive driving maneuvers, such as oversteer in the present application. The driver intended path may or may not follow the road or the road curvature.

In the Sharp reference, the model is directed to three known steering control situations and does not disclose path information at all. In the Peng reference, road curvature is known and the known road curvature path is used in calculating the look-ahead scale factor. However, the Peng reference does not teach or disclose a driver intended vehicle path as claimed in the present invention.

The Peng reference teaches actual, known, path information, which is known road curvature information, and is either obtained by measuring the road geometry or is obtained from transportations agencies and retrieved from an on-board database. The road curvature information is information directed to the road itself and not the vehicle or driver parameters. The information used in Peng is from GPS, map data, etc. It is respectfully asserted that the known road curvature path taught in Peng is significantly different than the driver intended vehicle path taught and claimed in the present invention. The driver intended path claimed in the present invention is not based on known road curvature data. The driver intended path in the claimed invention may or may not follow a known road. The driver intended path associated with the present invention may veer from the known road, or it may be along a path with no known road information. Furthermore, the driver intended path associated with the present invention may be on a known road, yet allows the driver to follow the known road in an aggressive manner, for example one which emulates oversteer. The combined Sharp and Peng references teach following a known road curvature, and correcting steering wheel angle when the vehicle departs from the known road curvature path or a known steering control situation. Together the references clearly "avoid" oversteer, as opposed to the present invention, which purposely operates with oversteer.

Proposed claim amendments for **10/707,366** and references to **Figure 5** are shown in bold type:

1. (Proposed) A simulation system for simulating operation of an automotive vehicle, particularly during oversteer, said simulation system comprising:

an input device for providing vehicle information and path information;

a controller coupled to said input device and operable to simulate said automotive vehicle using a vehicle computer model, wherein said controller is programmed to

determine a rear side slip angle of said vehicle computer model **(100)**;

determine an initial steering wheel angle that is input to said vehicle computer model;

when said rear side slip angle is determined to be greater than a predetermined threshold **(100)**, determine a look ahead scale factor **(114)** and increase the distance of a look ahead point substantially on or near [[an]] a driver intended vehicle path as a function of said look ahead scale factor **(104)**;

determine a new steering wheel angle, which is input to said vehicle computer model at a time later than said initial steering wheel angle, ~~by comparing~~ based on the difference between said driver intended vehicle path [[with]] and said look ahead point on or near said driver intended vehicle path **(110)**;

operate said vehicle computer model with said initial steering wheel angle **(108)** when the difference is negligible **(106)** or said new steering wheel angle **(100)** when said difference is not negligible **(106)**; and

generate an output in response to said vehicle computer model and said initial steering wheel angle or said new steering wheel angle.

10. (Proposed) A method of operating a vehicle computer model having vehicle information and path information therein, the vehicle computer model being operated with oversteer, said method being operable on a digital computer system and comprising the steps of:

(a) determining a rear side slip angle of said vehicle computer model **(100)**;

(b) determining an initial steering wheel angle that is input to said vehicle computer model;

(c) when said rear side slip angle is determined to be greater than a predetermined threshold **(100)**, determining a look ahead scale factor **(114)** and increasing the distance of a look ahead point substantially on or near [[an]] driver intended vehicle path as a function of said look ahead scale factor **(104)**;

(d) determining a new steering wheel angle, which is input to said vehicle computer model at a time later than said initial steering wheel angle, ~~by comparing~~ based on the difference between said driver intended vehicle path [[with]] and said look ahead point on or near said driver intended vehicle path **(110)**;

(e) operating said vehicle computer model with said initial steering wheel angle **(108)** when the difference is negligible **(106)** or said new steering wheel angle**(100)** when said difference is not neglible **(106)**; and

(f) generating an output in response to said vehicle computer model and said initial steering wheel angle or said new steering wheel angle.

19. (Proposed) A method of operating a vehicle computer model having vehicle information and path information therein, the vehicle computer model being operated with oversteer, said method comprising the steps of:

determining a rear side slip angle of said vehicle computer model **(100)**;

determining an initial steering wheel angle that is input to said vehicle computer model;

determining a look ahead point that is substantially on or near [[an]] a driver intended vehicle path for said vehicle computer model;

when said rear side slip angle is determined to be greater than a predetermined threshold **(100)**, determining a look ahead scale factor **(114)** and increasing the distance of said look ahead point as a function of said look ahead scale factor **(104)**;

when said rear side slip angle is alternatively determined to be less than said predetermined threshold, maintaining the distance of said look ahead point **(102)**;

when said vehicle computer model is determined to be headed off a predetermined target **(106)**, determining a new steering wheel angle **(110)**, which is input to said vehicle computer model, ~~by comparing~~ based on the difference between said driver intended vehicle path with said look ahead point on or near said driver intended vehicle path;

operating said vehicle computer model with said initial steering wheel angle **(108)** when the difference is negligible **(106)** or said new steering wheel angle when said difference is not neglible **(106)**; and

generating an output in response to said vehicle computer model and said initial steering wheel angel or said new steering wheel angle.

Very truly yours,

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